B.Tech. Semester-I (Civil Engineering-Major)

S N	Course Category	Course Code	Name of Course	BoS	Teaching Scheme (hrs.)			Total Credit	Examination Scheme						
									Theory				Practical		
					(Th)	TU	P		Exam Hrs.	SEE	CIE	Min.	SEE	CIE	Min.
1	BSC - I	BCV1T01	Matrices & Differential Calculus	ASH	3	-	-	3	3	70	30	45	-	-	-
2	BSC – II	BCV1T02	Applied Physics	ASH	2	-	-	2	3	70	30	45	-	-	-
3	BSC – II	BCV1P02	Applied Physics Lab	ASH	-	-	2	1	-	-	-		25	25	25
4	ESC – I	BCV1T03	Engineering Graphics for Civil	Civil	3	-	-	3	3	70	30	45	-	-	-
5	ESC – I	BCV1P03	Engineering Graphics for Civil Lab	Civil	-	-	2	1	-	-	-	-	-	50	25
6	ESC – II	BCV1T04	Fundamentals of Vastushastra	Civil	3	-	-	3	3	70	30	45	-	-	-
7	ESC – II	BCV1P04	Fundamentals of Vastushastra Lab	Civil	-	-	2	1	-	-	-	-	25	25	25
8	AEC-I	BAE1T01	Communication Skills	ASH	1	0	0	1	2	35	15	23			
9	AEC-I	BAE1P01	Communication Skills Lab	ASH	0	0	2	1	--	--	--	--	25	25	25
10	VSC - I	BVS1P01	Construction Workshop Practices Lab	Civil	-	-	4	2	-	-	-	-	50	50	50
11	CC – I	BCC1P01	Refer CC Basket	ASH	-	-	4	2	-	-	-	-	-	100	50
			Total		**12**	**-**	**16**	**20**		**315**	**135**		**125**	**275**	

Dr. K.R. Dabhekar

Dr. Ranjeet Patil

RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR
FACULTY OF SCIENCE & TECHNOLOGY
B.TECH. CIVIL ENGINEERING

Sem: I	Total Hours Distribution per week		
Total Credit : 3	Lecture (L): 3 Hrs	Tutorial/Activity (T/A): 0 Hr.	
Subject Code	BCV1T01	Matrices and Differential Calculus	
Examination Scheme			
Internal Marks:	University Marks:	Minimum Passing Marks:	Examination Duration:
30 Marks	70 Marks	45 Marks	3 Hours

Course Objectives	
1	The topics covered will equip them the techniques to understand advanced level mathematics and its applications that would enhance analytical thinking power.
2	The aim is to inculcate and develop the basic mathematics skills of engineering students that are imperative for effective understanding of engineering subjects.

Course Outcomes	
After completion of syllabus, students would be able to	
1	Apply elementary transformations to determine its rank and interpret the various solutions of system of linear equations. Identify the special properties of a matrix such as the eigen value, eigen vector, to express the matrix into diagonal form.
2	Apply the concept of successive differentiation to express the function in series form and evaluation of indeterminate forms.
3	To understand the significance of derivatives of functions of several variables and use it to find series approximation to the functions of two variables, extreme values of the functions and functional relationship.
4	To solve ordinary differential equations using elementary techniques and apply it to formulate mathematical models for simple electrical circuits.
5	To solve higher order differential equations by using various techniques and apply it to solve the problems in engineering field.

SYLLABUS

Details of Topic	Allotment of Hours		Mapped with CO Number
	L	T/A	CO
Unit-1 Matrices			

Rank of a matrix, Consistency of linear system of non-homogeneous and homogeneous equations, Linear dependence of vectors, Eigen values and Eigen vectors, Cayley- Hamilton theorem, Sylvester's theorem (Statement only), Inverse of matrix	7		1
Unit 2: Differential Calculus			
Successive differentiation: Leibnitz's Rule, Taylor's and Maclaurin's series for function of one variable, Indeterminate forms and L'Hospital's Rule.	5		2
Unit 3: Multivariable Calculus (Differentiation)			
Functions of several variables, First and Higher order partial derivatives, Euler's theorem, Chain rule and Total differential coefficient, Functional Relationship between two functions using Jacobians, Taylor's and Maclaurin's series for function of two variables. Maxima and Minima for function of two variables, Lagrange's method of undetermined multipliers.	10		3
Unit 4: First Order Ordinary Differential Equations			
Reducible to linear (Bernoulli's) differential equations, Exact differential equations (excluding the cases of integrating factors), Equations of first order and higher degree: Solvable for p, Solvable for y, Solvable for x and Clairaut's type, Application of first order differential equation to simple electrical circuits.	5		4
Unit-5:Higher Order Ordinary Differential Equations			
Higher order ordinary linear differential equations with constant coefficients, Method of variation of parameters, Cauchy's homogeneous differential equations, Equations of the type $d^2y/dx^2=f(y)$.	9		5

Text/Reference Books:

(1) Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
(2) Ramana B.V., Higher Engineering Mathematics, Tata Mc-Graw Hill, New Delhi, 11th Reprint, 2010.
(3) N.P. Bali and Manish Goyal, A Text Book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
(4) B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
(5) P. N. Wartikar and J. N. Wartikar, Applied Mathematics, Volume I and II.
(6) H. K. Dass, Rama Verma, RajnishVerma, V.J. Dagwal, Sajid Anwar and D.F. Shastrakar, Engineering Mathematics, Volume I and II, S. Chand.

RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR
FACULTY OF SCIENCE & TECHNOLOGY
B.TECH- CIVIL ENGINEERING

Sem: I	Total Hours Distribution per week	
Total Credit : 2	Lecture (L): 2Hrs	Tutorial/Activity (T/A): 0 Hr.
Subject Code	BCV1T02	Applied Physics

Examination Scheme			
Internal Marks:	University Marks:	Minimum Passing Marks:	Examination Duration:
30 Marks	70 Marks	45 Marks	3 Hours

Course Objectives	
1	To introduce ideas of quantum mechanics necessary to understand the function of semiconductor devices
2	To gain an understanding of the phenomenon of interference used for advanced applications in optics
3	To familiarize prospective engineers with fundamental concepts of semi conductors and their applications in semiconductor technology
4	To make acquainted with the laser technology and the operations of Laser

Course Outcomes	
After completion of syllabus, students would be able to	
1	Learn the basic concepts of the dual nature of matter and wave packet and apply them to analyze various relevant phenomena and to solve related numerical problems.
2	Apply concepts in interference and diffraction to solve relevant numerical problems and to relate to relevant engineering applications
3	Identify and explain different types of diodes, transistors, and its applications.
4	Learn and explain quantum transitions and apply them to the working of lasers.

SYLLABUS

Details of Topic	Allotment of Hours		Mapped with CO Number
	L	T/A	CO
Unit-1 Quantum Mechanics			
Concept of wave-particle duality, De-Broglie Hypothesis, Matter Waves, Davisson-Germer Experiment; Bohr's Quantization condition. Concept of wave packets, Heisenberg Uncertainty Principle. Schrodinger wave equation (time dependent and time independent), Wave function Ψ and	6		1

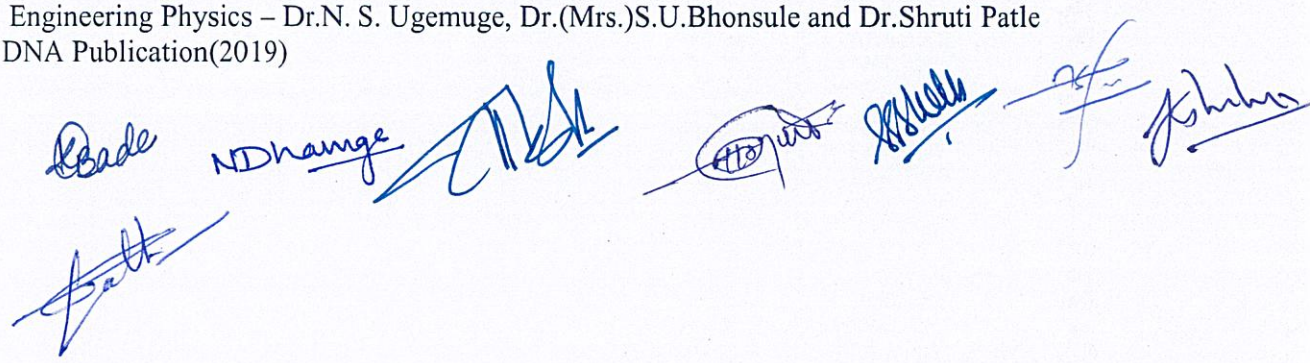
normalization condition, Application to one dimensional infinite potential well.			
Unit 2: Wave optics			
Huygen's principle, superposition of waves and interference of light by wavefront splitting and amplitude splitting, Interference in thin films, Interference in Wedge-shaped thin film, Newton's rings, and Anti-reflection coating.	6		2
Unit 3: Semiconductor Devices			
Semiconductor, Classification, Pure and doped semiconductors. Types of Semiconductor diodes -P-N junction Diode, Tunnel Diode, Zener Diode, Light Emitting Diode (LED), Photodiode. Transistors, Hall Effect, Hall voltage, and Hall coefficient; its applications.	6		3
Unit 4: Lasers			
Quantum Transitions: Absorption, Spontaneous emission & stimulated Emission, Metastable states, Principle of laser, Laser characteristics, Coherence length and coherence time, Pumping schemes: Three level and Four level. Optical Resonator, Construction & working of Ruby laser and He-Ne laser, Semiconductor diode laser, Applications of laser.	6		4

Text Books &Reference Books

1. P. M. Mathews and K. Venkatesan, A Textbook of Quantum Mechanics, Tata McGraw Hill (1977).
2. J. L. Powell and B. Crasemann, Quantum Mechanics, Narosa Publishing House (1993).
3. Charles Kittel, Introduction to Solid State Physics, Wiley Eastern, 5th edition, (1983).
4. A. J. Dekker, Solid State Physics, Prentice Hall of India (1971).
5. A Textbook of Engineering Physics, Dr. M. N. Avdhanulu, Dr. P. G. Kshirsagar, S. Chand Publication
6. Text book of Applied Physics, Dr. D. S. Hardas, Dr. D. S. Bhoumik, Dr.S. Shastri, Das Ganu Publication ISBN-978-93-84336-59-2 (2021)
7. Applied Physics, M. N. Avdhanulu, Shilpa A. Pande, Arti R. Golhar, Mohan Giriya, S. Chand
8. A Text Book of Engineering Physics Dr. DevashreeHardas& Dr. Ashish Panat, Das Ganu Publication ISBN-978-81-921757-7-5 (2011)
9. Applied Physics, - Dr. (Mrs) S.P. Wankhede, Dr.ShrutiPatle, Dr. (Mrs.)S.U.Bhonsule and Dr.N. S. Ugemuge DNA Publication ISBN-978-81-945174-6-7 (2020)
10. Quantum Physics of Atoms, Molecules, Solids, Nuclei, and Particles by R. Eisberg and R. Resnick, Wiley and Sons
11. Engineering Physics, second edition, Sanjay Jain, G. Sahasrabudhe, University's Press(India) Pvt. Ltd.(2016)
12. D. J. Griffiths, Quantum mechanics, Prentice Hall of India Private Limited, New Delhi
13. L. I. Schiff, Quantum Mechanics, TMH Publications
14. Advanced Engineering Materials - Dr. Sangeeta G. Itankar, Dr. Manjusha Dandekar, Dr. Tushar R. Shelke, Dr. Swati Fartode, Alliance & Co. ISBN 978-93-91322-12-0 (2023)
15. Applied Physics- Dr. Sangeeta G. Itankar, Dr. Manjusha Dandekar, Dr. Tushar R. Shelke, Dr. Swati Fartode, Alliance &Co. ISBN 978-93-91322-97-7 (2023)
16. David Halliday, Robert Resnick, Jearl Walker, Principles of Physics, 10th Edition, John Wiley and Sons (2017)
17. Advanced physics - Dr.ShrutiPatle, Dr.(Mrs).S.U.Bhonsule, Dr.Ashish N. Bodhaye,

Dr.ManoharD.Mehare DNA Publication (2019)

18. Engineering Physics – Dr.N. S. Ugemuge, Dr.(Mrs.)S.U.Bhonsule and Dr.Shruti Patle DNA Publication(2019)



RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR
FACULTY OF SCIENCE & TECHNOLOGY
B.TECH. CIVIL ENGINEERING

Sem: I	Total Hours Distribution per week		
Total Credit :1	Practical (P): 2 Hrs.		
Course Code	BCV1P02	Applied Physics Lab	
Examination Scheme –Practical			
Internal Marks:	University Marks:	Minimum Passing Marks:	Examination Duration:
25 Marks	25 Marks	25 Marks	--

List of Experiments: Performance of at least eight experiments is compulsory in a semester.

Exp. No.	List of Experiments
1	Energy gap of semiconductor /thermistor.
2	Parameter extraction from V-I characteristics of PN junction diode.
3	Parameter extraction from V-I characteristics of Zener diode.
4	Parameter extraction from V-I characteristics of PNP/NPN transistor in CB and CE mode.
5	V-I Characteristics of Tunnel diode.
6	V-I Characteristics of Light Emitting Diodes/ Determination of Plank's constant by using LEDs.
7	Study of Diode rectification.
8	Study of Hall Effect and determination of Hall Voltage of a given sample.
9	Variation of Hall coefficient (RH) with temperature.
10	To study B-H curve and to find out the values of coercivity, retentivity, and saturation magnetization of the experimental material.
11	Determination of NA for optical fiber
12	Calibration of Time Base circuit of CRO and determination of AC, DC voltage & frequency of electrical signals using CRO.
13	To determine the number of lines per cm on a diffraction grating using a LASER beam.
14	Virtual Lab: Experiment on the determination of the thickness of a thin foil using an air wedge arrangement.
15	Virtual Lab: Experiment on the determination of the refractive indices of the material corresponding to ordinary and extra - ordinary rays.

RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR
FACULTY OF SCIENCE & TECHNOLOGY
BTECH CIVIL ENGINEERING

Sem: I	Total Hours Distribution per week		
Total Credit:	Lecture (L): 3 Hrs	Tutorial/Activity (T/A): 0 Hrs.	Practical (P): 0 Hrs.
Subject Code	BCVE103T	Name of Subject: Engineering Graphics for Civil	

Examination Scheme			
Internal Marks:	University Marks:	Maximum Passing Marks:	Examination Duration:
30 Marks	70 Marks	45 Marks	3 Hours

Course Objective	
1	To acquire basic knowledge about engineering drawing language, line types, dimension methods, simple geometrical construction and building elements.
2	To acquire basic knowledge about physical realization of engineering objects and shall be able to draw their isometric views and knowledge about single line plans.
3	To visualize residential and public buildings and shall be able to draw their plan and elevations
4	To understand different components and services of a residential buildings and shall be able to draw their plan and elevations
5	To acquire basic knowledge about perspective drawing and draw simple perspective views

Course Outcome	
After completion of syllabus student able to	
1	understand the basic knowledge of lines, dimensioning techniques, scales, sheet layout, construct the orthographic projection and also will be able to draw free hand sketches of building elements
2	apply the visualization skill to draw a simple isometric projection/view using drawing equipment and draw single line plan and elevation of a single room building
3	prepare drawings (e. g. plan, elevation) of the residential and public buildings
4	draw different components and services of a residential buildings
5	prepare simple perspective drawings

SYLLABUS

Details of Topic	Allotment of Hours		Mapped with CO Number
	L	T/A	CO
Unit 1: Introduction to Engineering Graphics and Building elements	7		1
Introduction to Engineering Graphics, Use of various drawing instrument, Sizes of drawing sheets			
different types of lines used in drawing practice			
Dimensioning linear, angular, aligned system, unidirectional system			
Introduction to scales & scale factor (RF)			
Free hand sketches of basic building elements			
Unit 2: Isometric Projections and Building Drawing	8		2
Isometric view & Isometric projection of prism & pyramid with axis horizontal and vertical with construction of isometric scales			
Isometric view & Isometric projection of cone & cylinder with axis horizontal and vertical with construction of isometric scales			
Terms related to building drawing, Single line plan of a building			
elevation of single room building with verandah (Flat roof according to given line plan and specification)			
Layout plan, site plan of a building			
Unit 3: Single line Plan and elevation of buildings	7		3
Residential Buildings- Bungalows, Apartments/Flats etc.			
Public Buildings - Building for education: schools, colleges, institutions, libraries etc.			
Public Buildings -Buildings for health: hospitals, primary health centres etc.			
Public Buildings -Office buildings: banks, post offices, commercial complexes etc.			
Public Buildings -Building for public residence: hostels, boarding houses, guest houses etc.			
Unit 4: Components and Services of a residential Building	7		4
Staircase: (dog legged & open newel type)			
Foundations: stepped footing, isolated sloped footing and combined footing			
Openings: doors and windows			
Types of pitched roof (plan and elevation)			
Building services: Water supply, sanitary and electrical layouts			
Unit 5: Perspective drawing	7		5
One-point perspective			
Two-point perspective ofResidential building neglecting small elements of building such as plinth offset, lintel projections etc.			

References Books

1. Engineering Drawing, Bhatt, N. D. and Panchal, V.M., Charotar Publication, 2016
2. A Textbook of Engineering Drawing, Dhawan, R.K, S. Chand, New Delhi, 2000

3. Building Drawing with an Integrated Approach to Built Environment, M. G. Shah, C.M. Kale, S. Y. Patki, Tata McGraw-Hill Education, Sixth, 2020
4. Civil Engineering Drawing (including Architectural aspect), M. Chakraborti, Monojit Chakraborti Publications, Kolkata, 2015

RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR
FACULTY OF SCIENCE & TECHNOLOGY
B.TECH. CIVIL ENGINEERING

Sem: I	Total Hours Distribution per week		
Total Credit :1	Practical (P): 2 Hrs.		
Subject Code	BCV1P03	Engineering Graphics for Civil Lab	
Examination Scheme - Practical			
Internal Marks:	University Marks:	MinimumPassing Marks:	Examination Duration:
50 Marks	-	25 Marks	--

Practical Course Objectives	
1	To acquire basic knowledge about engineering drawing language, line types, dimension methods and simple geometrical construction.
2	To acquire basic knowledge about physical realization of engineering objects and shall be able to draw their isometric views and knowledge about single line plans.
3	To visualize residential and public buildings and shall be able to draw their plan and Elevations
4	To understand different components and services of residential buildings and shall be Able to draw their plan and elevations
5	To acquire basic knowledge about perspective drawing and draw simple perspective views

Practical Course Outcomes	
After completing the practical course, students will be able to	
1	Understand the basic knowledge of engineering graphics such as instruments, lines, dimensioning techniques, scales, sheet layout, construct the various engineering curves using the drawing instruments and basics of orthographic projection through drawing the Projection of point and line
2	Apply the visualization skill to draw a simple isometric projection/view from given Orthographic views precisely using drawing equipment and draw single line plan and elevation of a single room building
3	Prepare drawings (e.g. plan, elevation) of the residential land public buildings
4	Draw different components and services of a residential buildings
5	Prepare simple perspective drawings

LIST OF PRACTICAL:

Pr. No.	List of Practical
1	Types of lines, dimensioning, free hand building components
2	Minimum 4 problem on Isometric View showing building elements
3	Minimum 2 drawings of Single line plan and elevation of a single room residential building with verandah
4	Minimum 2 drawings of Single line plan and elevation of single storey residential buildings (3 rooms)

5	Minimum 2 drawings of Single line plan and elevation of public buildings
6	Minimum 2 problems on one-point and two-point perspective

References:

1. Bhatt, N.D. and Panchal, V.M.,(2016),"Engineering Drawing", Charotar Publication, Anand, India
2. Dhawan, R.K. ,(2000), "A Textbook of Engineering Drawing", S.Chand, NewDelhi
3. M.G.Shah,C.M.Kale,S.Y.Patki(2012),"BuildingDrawingwithanIntegratedApproach to Built Environment", Tata McGraw-Hill Education
4. Jolhe, D.A.,(2015),"Engineering Drawing" Tata Mc Graw Hill, New Delhi
5. ShahP.J,(2012),"Basics of Engineering Graphics", S. Chand, New Delhi
6. M. Chakraborti (2017) "Civil Engineering Drawing(including Architectural aspect)", Monojit Chakraborti Publications, Kolkata

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FACULTY OF SCIENCE & TECHNOLOGY
B.TECH. CIVIL ENGINEERING

Sem: I	Total Hours Distribution per week		
Total Credit : 3	Lecture (L): 3 Hrs	Tutorial/Activity (T/A): 0 Hr.	
Subject Code	BCV1T04	Fundamentals of Vastushastra	
Examination Scheme			
Internal Marks:	University Marks:	Minimum Passing Marks:	Examination Duration:
30 Marks	70 Marks	45 Marks	3 Hours

Course Objectives	
1	Basic ideology behind the use of vastushatra is to have better life.
2	The whole purpose of vastushatra is to create and attract positive cosmic energy.

Course Outcomes	
After completion of syllabus, students would be able to	
1	Understand the fundamentals of vastushastra
2	Understand the basics of interior and exterior of various building units
3	Understand the orientations of various rooms of residential as per vastushastra
4	Understand the defects as per vastu and remedial measures to rectify.
5	Understand the Building Planning by Laws

SYLLABUS

Details of Topic	Allotment of Hours		Mapped with CO Number
	L	T/A	CO
UNIT 1: Introduction of Vaastu			
Scientific background of Vaastu, Understanding Life force Energy, Importance of Five Elements, Use of Magnetic Compass,Types, shapes and selection of Land, Types of Soil Testing Vastu Methods	8		1
UNIT 2: Interiors and Exteriors			
Open Space planning and Building Design,Floor level, Height factors, Verandas, Balconies, Porch, Basements, Sumps & Borings,Boundary Walls, Parking, Security Guard Room, Overhead Tanks, Septic Tanks, Water flow, Plants and Greenery.	6		2
UNIT 3: Orientation of Home			
Master Bed Room , Kids room, Living Room, Kitchen, Dining Room,Bathroom, Drawing room, Study Room, Puja Room, Library, Store	8		3

room, Furniture making, Doors, Windows and ventilators, Main Entrance, Staircase, Servants room, Guest room.			
UNIT 4: Remedial Vaastu			
Identifying the Vastu Defects, Rectification of Vastu Defects in Existing Building, Color therapy.	6		5
UNIT 5: Building Planning by Laws			
Introduction to Building by Building Planning, Principle of Planning, Discussion on different building plans, Introduction to bye-laws	8		5

References Books

1. Ancient Science of Vastu by Siddharth Board and Dr. Jayshree Om.
2. Remedial Vaastu for home by Janhavi N. Sahasrabuddhe and Narendra Hari Sahasrabuddhe.
3. Scientific VaastuShastra in Home by Patel Sarjoo

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FACULTY OF SCIENCE & TECHNOLOGY
B.TECH. CIVIL ENGINEERING

Sem: I	Total Hours Distribution per week		
Total Credit :1	Practical (P): 2 Hrs.		
Subject Code	BCV1P04	Fundamentals of Vastushastra Lab	
Examination Scheme – Practical			
Internal Marks:	University Marks:	Minimum Passing Marks:	Examination Duration:
25 Marks	25 Marks	25 Marks	--

List of Experiments:

Exp. No.	List of Experiments:
1	Planning of interior components of residential building by Vastushastra
2	Planning of exterior components of residential building by Vastushastra
3	Review of residential building plan as per Vastushastra
4	Remedial plan as per Vastushastra

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FACULTY OF SCIENCE & TECHNOLOGY
B.TECH. CIVIL ENGINEERING

Sem: I	Total Hours Distribution per week	
Total Credit : 1	Lecture (L): 1Hrs	Tutorial/Activity (T/A): 0 Hr.
Subject Code	BAE1T01	Communication Skills

Examination Scheme			
Internal Marks:	University Marks:	Minimum Passing Marks:	Examination Duration:
15 Marks	35 Marks	23 Marks	2 Hours

Course Objectives	
1	Students would be able to enhance their communication skills.

Course Outcomes	
After completion of syllabus, students would be able to	
1	Construct grammatically correct sentences.
2	Identify and overcome barriers of communication.
3	Demonstrate good Listening and speaking skills.
4	Develop effective reading and writing skills.

SYLLABUS

Details of Topic	Allotment of Hours		Mapped with CO Number
	L	T/A	CO
UNIT 1			
Grammar: Tenses and its types, sentences and its Types, Transformation of Sentences (Assertive, Affirmative, Negative, Interrogative, Exclamatory) Reported speech	4		1
UNIT 2			
Introduction to Communication, Importance of communication Types of communication - Verbal and non-verbal Communications: - Kinesics, Vocalics, Chronemics, Haptics, Proxemics), Barriers to communication and methods to overcome them.	3		2
UNIT 3			
Introduction to LSRW Skills-, Listening Skills: Importance of listening, Types of listening, listening barriers and methods to overcome, Speaking Skills: Components of public speaking, Essential steps for public speaking, Overcoming stage fear in public speaking, Do's, and	4		3

Don'ts of Public speaking			
UNIT 4Remedial Vaastu			
Reading Skills: Importance of reading skills, Types of reading, omprehending passages, Writing Skills: Importance of effective writing, Paragraph writing, Email etiquettes.	3		4

References Books

1. Technical Communication by Meenakshi Raman and Sangeeta Sharma, OUP
2. Public Speaking and Influencing Men in Business by Dale Carnegie
3. Professional Communication Skills by Bhatia and Sheikh, S. Chand Publications
4. Communication Skills by Sanjeev Kumar and Pushpalata, OUP
5. Communication Skills by LalitaBisen, Bhumika Agrawal, N. ThejoKalyani, Himalaya Publishing House

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FACULTY OF SCIENCE & TECHNOLOGY
B.TECH. CIVIL ENGINEERING

Sem: I	Total Hours Distribution per week		
Total Credit :1	Practical (P): 2 Hrs.		
Subject Code	BAE1P01	Communication Skills Lab	
Examination Scheme – Practical			
Internal Marks:	University Marks:	MinimumPassing Marks:	Examination Duration:
25 Marks	25 Marks	25 Marks	--

List of Experiments: Any 8 experiments

Exp. No.	List of Experiments:
1	Barriers to Communication
2	Non-verbal Communication
3	Listening Skills
4	Reading Skills
5	Speaking Skills
6	Presentation Skills
7	Group Discussion
8	Interview Techniques
	Beyond/Additional Syllabus Experiments
9	Development of Word Power
10	Use of Figurative language

Textbooks/Reference Books

1 Technical Communication by Meenakshi Raman and Sangeeta Sharma, OUP
2 Public Speaking and Influencing Men in Business by Dale Carnegie
3 Professional Communication Skills by Bhatia and Sheikh, S. Chand Publications
4 Communication Skills by Lalita Bisen, Bhumika Agrawal, N.ThejoKalyani, Himalaya

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FACULTY OF SCIENCE & TECHNOLOGY
B.TECH. CIVIL ENGINEERING

Sem: I	Total Hours Distribution per week		
Total Credit :2	Practical (P): 4 Hrs.		
Subject Code	BVS1P01	Construction Workshop Practices Lab	
Examination Scheme – Practical			
Internal Marks:	University Marks:	Minimum Passing Marks:	Examination Duration:
50 Marks	50 Marks	50 Marks	--

List of Experiments: Performance of at least any eight experiments is compulsory in a semester.

Exp. No.	List of Experiments
1	Setting out of a building: The student should set out a building (two room only) as per the given building plan using tape only.
2	Construct a wall of height 60 cm and wall thickness 1½ bricks using English bond (Without mortar) - corner portion – length of side walls 100cm.
3	Construct a wall of height 60 cm and wall thickness 2 bricks using English bond (Without mortar) -corner portion – length of side walls 100 cm.
4	Installation of plumbing and fixtures like Tap, T-Joint, Elbow, Bend, etc
5	Preparation of mortar.
6	Preparation of concrete & testing for compressive strength
7	Casting and testing of Fly ash bricks.
8	Casting of paver block.
9	Site visit on ongoing construction site.
10	Study of various construction tools.
11	Study and scope of BIS codes (minimum 10)

B.Tech. Sem-II (Civil Engineering-Major)

S N	Course Category	Course Code	Name of Course	BoS	Teaching Scheme (hrs.)			Total Credit	Examination Scheme						
									Theory				Practical		
					(Th)	TU	P		Exam Hrs.	SEE	CIE	Min.	SEE	CIE	Min.
1	BSC–III	BCV2T05	Numerical Methods	ASH	3	-	-	3	3	70	30	45	-	-	-
2	BSC–III	BCV2P05	Numerical Methods Lab	ASH		-	2	1	-	-	-	-	25	25	25
3	BSC–IV	BCV2T06	Applied Chemistry	ASH	3	-	-	3	3	70	30	45	-	-	-
4	BSC–IV	BCV2P06	Applied Chemistry Lab	ASH			2	1	-	-	-	-	-	50	25
5	ESC– III	BCV2T07	Engineering Mechanics	Civil	3	-	-	3	3	70	30	45	-	-	-
6	ESC– III	BCV2P07	Engineering Mechanics Lab	Civil			2	1	-	-	-	-	25	25	25
7	PCC – I	BCV2T08	Building Construction Materials and Practices	Civil	2	-	-	2	3	70	30	45	-	-	-
8	IKS–I	BIK2T01	Refer IKS Basket	ASH	2	-	-	2	3	70	30	45	-	-	-
9	SEC - I	BSE2P01	Refer SEC Basket	ASH	-	-	4	2	-	-	-	-	50	50	50
10	CC– II	BCC2P02	Refer CC Basket	ASH	-	-	4	2	-	-	-	-	-	100	50
			Total		**13**	**-**	**14**	**20**		**350**	**150**		**100**	**250**	

Exit option: Award of UG Certificate in Major with 40 credits and an additional 8 credits in skill-based courses, internship, mini projects etc.

RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR
FACULTY OF SCIENCE & TECHNOLOGY
B.TECH. CIVIL ENGINEERING

Sem: II	Total Hours Distribution per week	
Total Credit : 3	Lecture (L): 3 Hrs	Tutorial/Activity (T/A): 0 Hr.
Subject Code	BCV2T05	Numerical Methods

Examination Scheme			
Internal Marks:	University Marks:	Minimum Passing Marks:	Examination Duration:
30 Marks	70 Marks	45 Marks	3 Hours

Course Objectives	
1	The objective of the course is to inculcate and strengthen analytical ability among the engineering students and to create zeal of working with higher mathematics and its applications in the extensive field of engineering. The topics covered will serve as the basic tool for specialized studies in the field of engineering and technology

Course Outcomes	
After completion of syllabus, students would be able to	
1	Apply different methods to solve Algebraic and Transcendental Equations.
2	To understand the various methods suitable and apply to solve the system of simultaneous linear equations.
3	To solve ordinary differential equations numerically by using the various methods and formulae.
4	To solve the problems having unequal and equal interval data by using suitable formula and fitting of curve using the given data.
5	Solving the problems of differentiation and integration numerically.

SYLLABUS

Details of Topic	Allotment of Hours		Mapped with CO Number
	L	T/A	CO
Unit-1 Solution of Algebraic and Transcendental Equations			
Types of iterative methods: Bisection method, Method of False position, Newton Raphson method and their convergence, Newton Raphson method for multiple roots, Direct iteration method.	7		1
Unit 2: Solution of system of simultaneous linear equations			
Gauss elimination method, Gauss Seidel method, Gauss Jordan method, Crout's method Largest Eigen value and its corresponding Eigen vector by iteration method.	6		2
Unit 3: Numerical solution of Ordinary differential equations			

Taylor's series method, Picards method, Euler's modified method, Rungekutta method of 4^{th} order, Milne's Predictor-Corrector method, RungeKutta method to solve simultaneous first order differential equations.	10		3
Unit 4: Interpolation			
Lagranges interpolation formula for unequal intervals, Newton's Forward and backward difference formula, Stirling central difference formula, Curve fitting.	8		4
Unit-5:Numerical Differentiation and Integration			
Numerical Differentiation: Forward, Backward and Central difference formula, Numerical Integration: Trapezoidal rule, Simpson's $1/3^{rd}$ rule, Simpson's $3/8^{th}$ rule.	6		5

Text/Reference Books:

(1) Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

(2) Ramana B.V., Higher Engineering Mathematics, Tata Mc-Graw Hill, New Delhi, 11th Reprint, 2010.

(3) N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

(4) B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

(5) P. N. Wartikar and J. N. Wartikar, Applied Mathematics, Volume I and II.

(6) H.K Dass, Rama Verma, RajnishVerma, V.J. Dagwal, Sajid Anwar and D.F. Shastrakar, Engineering Mathematics, Volume I and II, S. Chand.

RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR
FACULTY OF SCIENCE & TECHNOLOGY
B.TECH. CIVIL ENGINEERING

Sem: II	Total Hours Distribution per week		
Total Credit :1	Practical (P): 2 Hrs.		
Subject Code	BCV2P05	Numerical Methods Lab	
Examination Scheme – Practical			
Internal Marks:	University Marks:	Minimum Passing Marks:	Examination Duration:
25 Marks	25 Marks	25 Marks	--

Practical Course Objectives	
1	Solving problems using Open-Source Software SCILAB Programming Language

Practical Course Outcomes	
After completing the practical course, students will be able to solve the following using SCILAB Programming Language.	
1	Algebraic and Transcendental Equations by iterative methods.
2	System of simultaneous linear equations by iterative methods and direct methods.
3	Largest Eigen value and its Eigen vector of a matrix by iteration method.
4	Ordinary differential equations numerically by using the various iterative methods.
5	Interpolation Problems of unequal interval data and equal interval data.
6	Problems of numerical differentiation and integration for equal interval data.

LIST OF PRACTICAL: Performance of at least **SIX** practical is compulsory in a semester.

Pr. No.	List of Practical
	Unit-1 Solution of Algebraic and Transcendental Equations (06 Hours)
1	Write a SCILAB Program to solve Algebraic and Transcendental Equations by one of the iterative methods: Bisection method, and Method of False position.
2	Write a SCILAB Program to solve Algebraic and Transcendental Equations by one of the iterative methods: Newton Raphson method, Newton Raphson method for multiple roots and Direct iteration method.
	Unit 2: Solution of system of simultaneous linear equations: (04 Hours)
3	Write a SCILAB Program to solve the system of simultaneous linear equations by one of the iterative methods: Gauss Jordan method, and Gauss Seidel method,
4	Write a SCILAB Program to solve the system of simultaneous linear equations by one of the direct methods: Gauss elimination method, and Crout's method
5	Write a SCILAB Program to find the Largest Eigen value and its corresponding Eigen vector of a matrix by iteration method.
	Unit 3: Numerical solution of Ordinary differential equations: (04 Hours)

6	Write a SCILAB Program to solve ordinary differential equations numerically by the iterative method: Euler's modified method
7	Write a SCILAB Program to solve ordinary differential equations numerically by the iterative method: Runge Kutta method of 4^{th} order
8	Write a SCILAB Program to solve ordinary differential equations numerically by the iterative method: Milne's Predictor-Corrector method
	Unit 4: Interpolation: (04 Hours)
9	Write a SCILAB Program to solve the Interpolation Problems for unequal interval data by the formula: Lagranges interpolation formula
10	Write a SCILAB Program to solve the Interpolation Problems for unequal interval data by one of the formulas: Newton's Forward and backward difference formula, Stirling central difference formula
	Unit-5: Numerical Differentiation and Integration: (06 Hours)
11	Write a SCILAB Program to solve the problem of Numerical Differentiation by one of the formulas: Forward, Backward and Central difference formula
12	Write a SCILAB Program to solve the problem of Numerical Integration by one of the formulas: Trapezoidal rule, Simpson's $1/3^{rd}$ rule, Simpson's $3/8^{th}$ rule.

RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR
FACULTY OF SCIENCE & TECHNOLOGY
B.TECH. CIVIL ENGINEERING

Sem: II	Total Hours Distribution per week	
Total Credit: 3	Lecture (L): 3Hrs	Tutorial/Activity (T/A): 0 Hr.
Subject Code	BCV2T06	Applied Chemistry

Examination Scheme			
Internal Marks:	University Marks:	Minimum Passing Marks:	Examination Duration:
30 Marks	70 Marks	45 Marks	3 Hours

	Course Objectives
1	To create awareness about various materials used in modern technology and their interaction amongst themselves as well as environment
2	To make students learn about the environment and ensuring sustainable development

	Course Outcomes
	After completion of syllabus, students would be able to
1	Apply the basics concepts of electrochemistry & corrosion technology.
2	Know about fuels and lubricants and analyse the situation for their appropriate applications
3	Analyse the various industrial problems arising due to water quality and their remediation.
4	Develop the environmental awareness from the basics of green chemistry and its application.
5	Inculcate the use of instrumentation techniques and interpret its applications in material characterization

SYLLBUS

Details of Topic	Allotment of Hours		Mapped with CO
	L	T/A	
Unit-1: Electrochemistry and Corrosion Technology			
A] Electrochemistry: Electrochemical & Galvanic Series, Electrochemical & Electrolytic cell, Battery: Introduction, types, characteristics, components/materials, working and applications of Lithium-cobalt oxide and metal air batteries. Super capacitors: Introduction, types (EDLC, pseudo and asymmetric capacitor) with examples and applications. Energy conversion devices: Introduction, characteristics, materials, working and applications of H_2-O_2 fuel cells, amorphous Si and quantum dot sensitized solar cells. B] Corrosion: Theories of Corrosion (Dry, Wet and Differential Aeration), Pilling Bedworth Rule & Numerical, Factors affecting corrosion, Types of Corrosion (Waterline, pitting & Stress), Corrosion Protection- Design & Material Selection, Cathodic Protection	4+3		1

(Galvanic & Impressed Current)			
Unit-2: Fuels			
A] Fuels: Introduction: Calorific value, Higher and lower calorific value; determination of calorific value by Bomb and Boy's calorimeter; numerical based on calorific value determination; B] Liquid fuels –fractional distillation of crude petroleum(boiling point wise separation only) use of gasoline and diesel in internal combustion engine: knocking and chemical constitution of fuel, Octane and Cetane number, doping agents, Introduction to propellants and its classification.	4+3		2
Unit-3: Water Technology			
A] Water Purification Technology: Principles of coagulation and flocculation, Sterilization by using ozone and chlorine (Cl_2 gas & chloramine), Break point chlorination and its significance. Industrial Water Treatment: Softening of water-principle- reactions, advantages, limitations and comparison of Zeolite process, and Demineralization process. Numerical based on Zeolite process. B] Boiler Troubles–Causes, effect on boiler operation and methods of prevention – Scales and sludges. Desalination of sea water- Principle, method and advantages of electro dialysis and reverse osmosis processes	4+3		3
Unit-4: Green Chemistry			
A] Green Chemistry: Introduction, twelve principles of Green chemistry with examples, Numerical based on atom economy, Carbon sequestration & Carbon Credits B] Green reagents, Dimethyl carbonate and its applications, Supercritical carbon dioxide properties and applications Biopolymers: Classification based on type, properties and applications of collagen, chitosan.	4+3		4
Unit – 5: Material Characterisation Techniques			
Principles and applications of – A] Electronic Spectroscopy (Beer-Lambert's law and its numerical), Infra-Red spectroscopy and Nuclear Magnetic Resonance spectroscopy. B] Thermal analysis (Thermogravimetry, Differential Thermal Analysis, Differential Scanning Calorimetry), Scanning Electron Microscopy, Transmission Electron Microscopy, Atomic Force Microscopy, Brunauer Emmett-Teller (BET) surface area analysis, X-ray Diffraction Analysis, particle size analyser (Dynamic Light Scattering), High Performance Liquid Chromatography and Gas Chromatography	4+3		5

References/ Text Books

1. Engineering Chemistry, S S Dara, S Chand Publication
2. Engineering Chemistry, Jain & Jain, Dhanpat Rai Publication
3. Applied Chemistry, A V Bharati, Das Ganu Publication
4. Energy & Environment, A V Bharati, Das Ganu Publication
5. Spectroscopy, Y R Sharma, S Chand
6. Green Chemistry for Beginners, Anju Srivastava, Rakesh K. Sharma, Jenny Stanford Publishing
7. Instrumental Methods of Chemical Analysis, B. K. Sharma, Krishna Prakashan.
8. https://wiki.anton-paar.com/in-en/the-principles-of-dynamic-light-scattering/
9. Fundamentals of Solid Propellant Combustion, Kuo, K.K., Summerfield, M., Progress in Astronautics

& Aeronautics, Vol. 90, AIAA. 1984
10. https://onlinecourses.nptel.ac.in/noc24_ae09/preview

RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR
FACULTY OF SCIENCE & TECHNOLOGY
B.TECH. CIVIL ENGINEERING

Sem: II	Total Hours Distribution per week		
Total Credit :1	Practical (P): 2 Hrs.		
Subject Code	BCV2P06	Applied Chemistry Lab	
Examination Scheme – Practical			
Internal Marks:	University Marks:	Minimum Passing Marks:	Examination Duration:
50 Marks	--	25 Marks	--

List of Experiments: Performance of at least Anysix performance based and one virtual lab experiments is compulsory in a semester.

Exp. No.	List of Experiments
1	Proximate Analysis of coal
2	Estimation of viscosity of oil by Redwood Viscometer 1 or 2
3	Estimation of Flash point of lubricating oil by open/ closed cup apparatus
4	Estimation of Acid value of lubricant
5	Estimation of Consistency of grease by penetrometer
6	Estimation of Saponification value of lubricant
7	Estimation of Hardness of water (Total, Permanent & Temporary) by complexometry
8	Estimation of Alkalinity of water (Warder's Method)
9	Estimation of DO / free chlorine estimation
10	Estimation of Copper estimation (iodometrically)
11	Estimation of Ni by complexometry / gravimetry.
12	Fe(II)/ (III) estimation by redox titration.
13	Beer's Law verification by spectrophotometer.
14	Separation of copper nickel ions by paper chromatography.
15	Acid base titration by potentiometry
16	Acid base titration by potentiometry
17	Acid base titration by conductometry
18	Virtual Lab: Experiment on Calorimetry

RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR
FACULTY OF SCIENCE & TECHNOLOGY
B.TECH. CIVIL ENGINEERING

Sem: II	Total Hours Distribution per week	
Total Credit: 3	Lecture (L): 3 Hrs	Tutorial/Activity (T/A): Hrs.
Subject Code :	BCV2T07	Name of Subject: Engineering Mechanics

Examination Scheme			
Internal Marks:	University Marks:	Maximum Passing Marks:	Examination Duration:
30 Marks	70 Marks	45 Marks	3 Hours

Course Objective	
1	To Understand the force systems and draw free body diagram to analyze rigid body equilibrium.
2	To Comprehend the principles of friction and solve engineering mechanics problems associated with frictional force.
3	To introduce the concept of centriod and moment of inertia of plane area.
4	To make student aware about the method of joint and method of section to analyse the truss.
5	To Understand the concept of motion of particles and rigid bodies.

List of Course Outcome	
After completion of syllabus student able to	
1	Analyse a given force system and apply the knowledge of force system and moment to determine resultant of various force system & apply the knowledge of equilibrium of force system.
2	To apply the basics of friction
3	Locate Centroid and compute area Moment of Inertia for standard shapes and composites areas.
4	Analyze simple determinate trusses
5	Analyze the connected system of particles using concept of dynamic equilibrium

SYLLBUS

Details of Topic	Allotment of Hours		Mapped with CO Number
	L	T/A	CO
UNIT 1: Basics Concepts and equilibrium of force systems			1
Introduction to Engineering Mechanics: Force Systems, Basic concepts, Rigid Body equilibrium;	3		
System of Forces, Coplanar Concurrent Forces, Resultant Moment of	4		

Forces and its Applications; Couples in 2D and 3D			
Equilibrium of System of Forces, Free body diagrams, Equations of Equilibrium of Coplanar Systems. Simple beams and support reactions. Diagram of Statically Determinate Beams.	3		
UNIT 2: Friction			2
Types of friction, Limiting friction, Laws of Friction, Static Friction; Motion of Bodies, wedge friction, ladder friction Belt friction	5		
UNIT3: Centroid and Moment of Inertia			3
Centroid and Centre of Gravity, Centroid of standard shapes and application to composite plane shapes; Area moment of inertia: formula of area moment of inertia of standard shapes, parallel and perpendicular axis theorem, application to composite plane shapes	7		
UNIT4: Analysis of structures- Trusses			4
Assumption and Analysis of simple trusses by method of joints & method of sections	5		
UNIT5: Kinetics of Particles			5
Kinetics of particles D'Alemberts principle and its application in connected system of particles, Impulse Momentum, Collision of bodies, Work Energy Method.	5		

References/ Text Books

1. Vector Mechanics for Engineers: Statics and Dynamics, Johnston. R.E., Beer. F., Eisenberg. E. R, & Mazurek. D., McGraw Hill
2. Engineering Mechanics: Principles of Statics and Dynamics, R. C. Hibbler, Pearson Press
3. Engineering Mechanics, S SBhavikatti, Newage International publication

RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR
FACULTY OF SCIENCE & TECHNOLOGY
B.TECH. CIVIL ENGINEERING

Sem: II	Total Hours Distribution per week		
Total Credit :1	Practical (P): 2 Hrs.		
Subject Code	BCV2P07	Engineering Mechanics Lab	
Examination Scheme – Practical			
Internal Marks:	University Marks:	Minimum Passing Marks:	Examination Duration:
25 Marks	25 Marks	25 Marks	--

Note: Minimum eight practical shall be performed from list of experiments out of which any Two practical may be performed using virtual lab.

Exp. No.	List of Experiments
01	Jib Crane Experiment: Equilibrium of coplanar force system, Analyzing forces acting on a jib crane to determine forces.
02	Law of Moment.
03	Law of Polygon of forces: Verification of law of polygon of forces.
04	Parallel force apparatus: Equilibrium of coplanar parallel force system. /Determining the Support reaction using Simply supported beam / parallel force apparatus.
05	Shear legs apparatus: Equilibrium of Non coplanar Concurrent force system.
06	Coil Friction apparatus: Determining the Coefficient of static friction using coil friction apparatus.
07	Inclined Plane setup: Determination of coefficient of static friction for different surfaces (Materials).
08	Flywheel Apparatus: Determination of mass moment of inertia of a flywheel.
09	Joint Roof truss apparatus: To calculate the forces in the members of roof truss.
10	To find the forces in the member of truss using graphical method and analytical method.
11	Performance of Simple Lifting Machine: Determination of efficiency and Law of machine of Differential Axle and Wheel.
12	Performance of Simple Lifting Machine: Determination of efficiency and Law of machine of Double Purchase Carb.
13	Performance of Simple Lifting Machine: Determination of efficiency and Law of machine of Single Purchase Carb.
14	Kinetics of particles (Collision of bodies)

RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR
FACULTY OF SCIENCE & TECHNOLOGY
B.TECH. CIVIL ENGINEERING

Sem: II	Total Hours Distribution per week		
Total Credit : 2	Lecture (L): 2 Hrs	Tutorial/Activity (T/A): 0 Hr.	
Subject Code	BCV2T08	Building Construction Materials and Practices	
Examination Scheme			
Internal Marks:	University Marks:	Minimum Passing Marks:	Examination Duration:
30 Marks	70 Marks	45 Marks	3 Hours

Course Objectives	
1	To prepare the students to understand components of buildings and their functions.
2	To prepare students to understand execution of various constructions material.
3	Familiarize the students to understand the necessity and behavior of foundations

Course Outcomes	
After completion of syllabus, students would be able to	
1	Differentiate and identify types of building materials.
2	Identify components of a building.
3	Know & identify the types of finishing and effects.
4	Select appropriate material for building construction.

SYLLABUS

Details of Topic	Allotment of Hours		Mapped with CO Number
	L	T/A	CO
UNIT 1			
Stones- Types of Stones, Requirements of Good Building Stones, Dressing of stones, Deterioration and Preservation of Stone Work.	2		1
Bricks - Classifications, Manufacturing of Clay Bricks, Requirements of Good Bricks.	2		
Lime- Classification, Properties.	1		
UNIT 2			
Doors, Windows and Ventilation- Location of Doors and Windows, Technical Terms, Material for Door and Windows	3		2
Form Work- Introduction to Formwork, Scaffolding	2		
UNIT 3			
Foundation-Introduction, Necessity of Foundation, Causes of failure of	3		3

Foundations and Remedial Measures.			
Types of Structure- Load Bearing Structures and Framed Structures.	2		
UNIT 4			
Wall Finishes, Plastering, Paintings, Purposes, Methods, Defects and their Solution, Glass- Types and Uses	4		4

Reference Books:

1. Building Construction by Rangwala.
2. Building Construction & Construction Materials by G. S. Birde & T. D. Ahuja.
3. Building Construction by Arun Kr. Jain Ashok Kr. Jain & B. C. Punmia.
4. Building Construction by Gurucharan Singh.

RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR
FACULTY OF SCIENCE & TECHNOLOGY
B. TECH CIVIL ENGINEERING

Sem: II	Total Hours Distribution per week		
Total Credits: 02	Practical (P): 4Hrs.		
Course Code	BSE2P01	Skill Enhancement Course (Introduction to Computer Aided Drawing)	
Examination Scheme			
College Internal Examination	Semester End Examination	Minimum Passing Marks	Examination Duration
50	50	50	----

List of the activities:

1. Introduction to drafting software and basic commands to draft various shapes like line, square, rectangle circle, arc, etc.
2. Use of editing and dimensioning commands with special emphasis on the use of scale, page set – up for plotting a drawing.
3. Drafting of various types of bonds in brickwork.
4. Drafting of various types of arches.
5. Drafting of various types of doors and windows.
6. Drafting of various types of stairs.
7. Drafting sketches of Spread footing and Reinforced Cement Concrete Column Footing
8. Drafting of a double line plan for a One Bed Room, Hall and Kitchen residential building (including bath and water closet)
9. Drafting of a double line plan for a Two Bed Rooms Hall and Kitchen residential building (including staircase, 1 attached and 1 common toilet)
10. Drafting of a double line plan for a public building like a primary school, college building, bank, clinic, post office, etc.